6.3.1 - Process to treat waste water

1. Raising awareness among Alexandria University students from various faculties—including Science, Engineering (Civil, Mechanical, and Mechatronics), Commerce, Arts (Surveying, mapping, and GIS), and Fine Arts (Architecture)—about wastewater treatment was achieved through summer training and periodic visits to the laboratories of the AlexandriaSewerage Company. This effort supports the achievement of the Sustainable Development Goals by enhancing partnerships for sustainable development and fostering collaborations that mobilize and share knowledge, expertise, and technology. The training aimed to provide students with essential scientific skills and practical experience to prepare them for the job market (September 2024).
   - **Faculty of Science:** Theoretical training introduced the role of the Sewerage Company, while practical training involvedvisits to treatment plants, central laboratories, and lectures on occupational safety and industrial sewage.
   - **Faculty of Arts (Surveying, mapping, and GIS):** Training included surveying applications, urban planning, and the practical use of leveling instruments, total stations, and GPS devices, concluding with lessons on ArcGIS and sewage system design.
   - **Engineering Colleges:** Civil Engineering students trained in network renewal and design, while Mechanical andMechatronics students learned about pump components, welding, and electrical generators, with visits to various workshops.
   - **Fine Arts (Architecture):** Students received training on project design drawings and estimating costs.

2. A cooperation protocol was signed between Alexandria University and Alexandria Sewerage Company to employ outstanding graduates from the faculties of Engineering, Commerce, Law, Science, and Arts over the past five years, based on the actual needs and annual workforce plan of the sewerage company. Additionally, the protocol aims to prepare a new generation of skilled professionals in modern technologies. It includes agreements for employees to access masters and doctoral programs at reduced fees and to conduct workshops and training courses with professorsfrom Alexandria University to enhance partnerships for sector performance and achieve sustainable development goals.

Alexandria University also has a large number of research projects in the field of waste recycling, treatment and reuse of sewage and industrial wastewater.

- Evaluation of the performance of an innovative microbial fuel cell and its applications in Water and industrial WasteWater desalination, (2019-2020).
- Enhancing Resource Recovery and Improving Wastewater Reuse Through Synergistic Cooperation between Bioelectrochemical Systems and Forward Osmosis, (2019-2024).
- River and Wastewater Treatment Using Microbial Flocculants, (2020-2022).
- A novel combined approach for Poultry slaughterhouse wastewater treatment: prototype design and development,(2021-2024).
- Agricultural sustainability and water reuse in Egypt: innovative wastewater treatment and soil health, (2021-2024).
- Towards a green Economy Farm: Innovative Solar Collector for Biochar Production from Agricultural & Food Industry Wastes, Power Generation, and Crops Drying, (2021-2023).
- Wastewater Treatment by Integrated Green Coagulation and Membrane Technology for Reuse, (2021-2024).
- Construction of a Self-Charging Unit for Collecting Wasted Mechanical Energy from Basic Human Motion, (2023-2025).
- Production, modification and new prospects of biochar derived from biomass waste, (2023-2026).
- Microbial technology as a bioremediation tool for heavy metals removal from industrial wastewater throughproteomic and nanotechnological approaches, (2023-2025).

Alexandria University program for Sewage Disposal

- Providing a sewage treatment plant at the university to make it suitable for irrigating green areas and gardens inside the university campus.
- The irrigated water supplied to the fish farm at the Agriculture Experimental Research Station of the Faculty of Agriculture is recycled to irrigate the crops, vegetables, and fruits of the land farm. The recycled water is rich with natural fertilizers and enhances the crops production.
- In addition, the water recycling in Fish Aquaculture of the Faculty of Agriculture, Alexandria University: The water sewage of the Aquaculture of the Faculty of Agriculture, Alexandria University which consist of eight ponds (one acre and quarter/each) in Abis region. Alexandria University used the recycled water for crops culturing in the adjacent agriculture research center in Abis.
- The use of biochar produced from Agricultural waste and waste Forests in residual removal chlorpyrifos pesticide Imidacloprid is from water agricultural drainage. Cooperation project between the Egyptian Academy of Research Science and Technology and the Czech Academy of Sciences.
- The sewage water will be treated and reused in the irrigation of green areas in Alexandria National University.
- Faculty of Pharmacy is seeking to implement a grey water (wastewater) recycling system that depends on reusing wastewater from sewage basins only (without using wastewater from laboratory basins) by repumping it into the flushing bins in the toilets after work. Filtration and primary treatment. The grey water recycling initiative has a significant impact on rationalizing water use.

The water sewage of the Aquaculture of the Faculty of Agriculture (Alexandria University, Egypt)
The irrigated water supplied to the fish farm at the Agriculture Experimental Research Station of the Faculty of Agriculture is recycled to irrigate the crops, vegetables, and fruits of the land farm.

Wastewater treatment unit at Faculty of Engineering

The sewage water will be treated and reused in the irrigation of green areas in the project (Alexandria University)

Treatment of Alexandria University Sewage by Alexandria Sanitation Company

An amount of water of **1,240,575 m^3** is consumed by all faculties and institutes affiliated with the Alexandria University, of which the amount of sewage is **1,116,625.26 m^3**, which is lifted through a group of lifting stations to be treated throughtreatment stations affiliated with the Alexandria Sanitation Company.

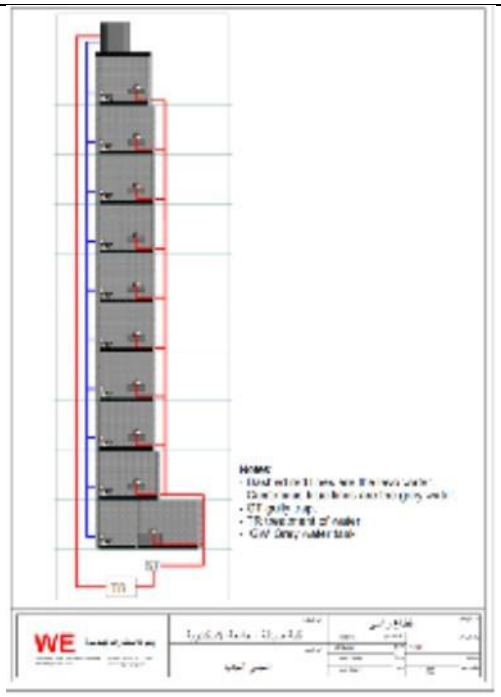
1. Secondary biological treatment, where solid waste is separated from liquid waste.
2. **Treated water:** As for the water resulting from first treatment, it is reused within the New Delta Project (the valueof the reused water for Alexandria University represents **1,116,625.26 m^3**).
3. The Tertiary treatment for use in land reclamation with a design capacity of 7.3 million m^3,include 1.7 million cubic meters of treated wastewater form the secondary treatment.

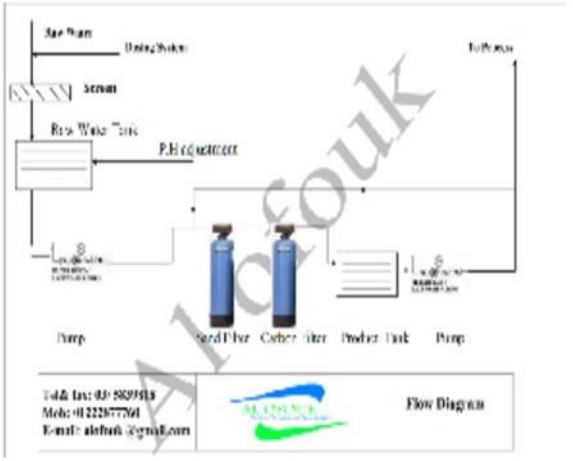
Second treatment of Alexandria University Sewage by Alexandria Sanitation Company

Reclaiming 800 thousand acres in the new delta using treated water from sewage

Green Cycle Project in Faculty of Pharmacy – Alexandria University

The Faculty is advancing the “Green Circle” project, which is a non-profit project that seeks to keep the environment cleanand green in a sustainable way by separating waste for recycling and establishing charitable markets to benefit from usedclothes. Also, the faculty is seriously seeking to implement a grey water (wastewater) recycling system that depends on reusing wastewater from sewage basins only (without using wastewater from laboratory basins) by re-pumping it into theflushing bins in the toilets after work. Filtration and primary treatment.





Grey water recycling system organized by Faculty of Pharmacy (Alexandria University)